

REVIEWS AND ABSTRACTS.

- A. W. SAMPSON: *Plant Succession on Burned Chaparral Lands in Northern California*. University of California Bull. 685, 1944. 144 pp., 46 figs., 17 tabs.

This bulletin will be of particular interest to those who are concerned about veld-burning in the sclerophyll scrub vegetation of the South-western Cape, because many of the problems associated with burning of chaparral vegetation in Northern California are analogous to those encountered here. The author is Professor of Forestry at the University of California and Plant Ecologist at the California Agricultural Experiment Station. He is an authority on the management of pasture lands, and has conducted studies of succession on burned chaparral areas over a period of fifteen years.

The bulletin is introduced by a brief description of ecological characteristics of chaparral vegetation followed by a historical résumé of burning practices. The chaparral, like the sclerophyll scrub of the Cape, was burnt by indigenous races before European settlement. Sampson considers, however, that the burning was not sufficiently extensive or frequent to have a marked effect on the vegetation. Burning apparently reached maximum proportions through the activities of the white settler, in the eighties, but has since somewhat decreased through enforcement of improved legislation. The State Board of Forestry does not attempt complete protection of all lands under its control. Three vegetation zones are recognised. Zone 1 consists of the more valuable timber and water-shed lands, and also includes state parks and monuments, as well as other such areas subject to serious economic loss by fire. The lands in Zone 2 are less important in the matter of fire protection. They form a "buffer" zone. Zone 3 includes grassy valleys and agricultural lands, which are chiefly of local interest.

From a study of the literature Sampson concludes that no single criterion may safely be used to predict the outcome of burning. "An unusually dry or wet season preceding or following burning may unpredictably affect the plant population of burned areas. The seed of some inconspicuous plant which has accumulated in the soil for many years may germinate in large numbers under the suddenly changed conditions brought about by burning, and thus result in the conspicuous presence of that particular species after the fire. Only as a result of

careful study in a particular area, taking into account all possible biotic, climatic and topographic factors, can rational prediction of plant succession be made." This conclusion applies equally well to the sclerophyll scrub of the Cape.

The main portion of the bulletin is devoted to the results of sample plot and other studies of plant succession on burns. Many of these results will be of considerable interest to Cape botanists and numerous interesting comparisons between the two vegetational regions could be made. Conclusions, which appear to support observations made in sclerophyll vegetation at the Cape, are: that burning at infrequent intervals may, and often does, extend the chaparral cover; that the heat generated by a fire, activates the seeds of some chaparral species, which apparently lie dormant for long periods under the unburned ground cover; that the root crowns of sprouting brush species are remarkably adjusted to endure severe and frequent burning, so that vigorous sprouting takes place after a fire. An outstanding feature of the succession on burns in the Cape sclerophyll scrub not mentioned by Sampson, and which is therefore apparently not so striking in the chaparral, is the profuse flowering of numerous geophytic plants.

Sampson groups the chaparral species into trees and shrubs (sprouting and non-sprouting); broad-leaved herbs; and grasses. It would, however, have been an improvement had the second group been divided into life-form classes, such as therophytes and geophytes. It would probably also have been more satisfactory for readers not intimately acquainted with the Californian flora, had the Latin names been used in the text instead of the popular ones.

The publication is readable and is recommended to all who are interested in the ecology of sclerophyll vegetation, and more particularly in the effects of fire.

C. L. WICHT.

S. D. GARRETT: *Root Disease Fungi*. 177 pp. Waltham, Mass., the Chronica Botanica Co., 1944. \$4.50. Johannesburg, Central News Agency, Ltd.

The fungi which cause root diseases are members of many systemic groups and are alike only in sharing as their common habitat the soil and the roots which occupy it. The volume under review is in no sense a textbook of these fungi, but concerns itself with their way of life and their ecological relations to the soil and its other inhabitants. By

limiting himself mainly to the consideration of a relatively small number of economically important fungi, the author has been able to discuss in detail the varied and complex factors which decide whether root or fungus shall survive.

To the plant pathologist, this new volume from Rothamsted is a valuable progress-report of widely-scattered investigations ranging from 1858 to 1942; a bibliography of some 400 titles is appended. To the cultivator of plants, its six concluding chapters offer a review of practical measures of disease-control in crop-plants of the field, plantation and glasshouse. To both, it is a milestone along one of the many highways leading to a fuller understanding of the soil from which humanity draws its main sustenance.

E. S. MOORE.

JAMES G. HORSFALL: *Fungicides and Their Action*. Waltham, Mass., the Chronica Botanica Co. \$5.00. Johannesburg, Central News Agency, Ltd.

Plant pathologists owe much to the Chronica Botanica Co. First it gave us Bawden's "Plant Viruses and Virus Diseases," then Garrett's "Root Disease Fungi," and now Horsfall's "Fungicides", all written by masters of their subjects. Dr. Horsfall is a particularly happy choice. He has been intimately connected with, and has taken an active part in, that great advance of knowledge of fungicides which has occurred during the last decade or two. His own contributions run through almost the whole field of fungicides: the action of copper and sulphur compounds, inoculum potentials, field assays, problems of deposition, coverage and weathering, dosage-response relationships, antagonisms, synergism, and phytotoxicity. In his book one expects, and one gets, a standard of discussion which only authority and familiarity with the subject can give. Particularly valuable is the author's ability to select from the mass of facts in the modern literature those which are specially significant and likely to start new lines of progress. One might instance the way he picks out the possibilities of using basic nitrogen compounds as antidotes for the toxins of vascular diseases and root rots. Time may show some of the judgments faulty; but the book is never dull, and Dr. Horsfall's way of approach will be a stimulus to research in the whole field he covers.

The weak point of the book is the chemistry. Formulae are repeated correctly, but one gets the impression that the author is out of his element

when it comes to the chemical side. One shudders, for example, to see chlorobenzene and dichloramine T in the same context. To pursue the same subject for a further example, dichloramine T is used as an illustration of the notion that chlorination increases the fungicidal properties of organic substances which are fungicidal to begin with, whereas in fact dichloramine T shares its potency with other chloramines, even those derived from inert organic compounds like methylamine being fungicidal and the inorganic chloramines being as potent as, and more widely used than, the organic. One does not wish to harp on this weakness, for despite it the book is very good, and one only does so in the hope that there will be an improvement when the book reaches a second edition, which it richly deserves.

The print is readable and the volume well got up.

J. E. VAN DER PLANK.

JOSEPH C. GILMAN: *A Manual of the Soil Fungi*. Ames, Iowa; The Collegiate Press, 1945. xiv 392 pp. 135 figs. Price \$5.

When the first comprehensive treatise on soil fungi by Niethammer appeared (1937), one could not but help feeling disappointed at the incompleteness and inaccuracy of the work. Gilman's book, though less pretentious, certainly marks an advance in the systematic treatment of the soil fungi. The author is well aware of the restrictions of his Manual: he has not attempted to give many original data or descriptions, but wanted to provide "a tool in the hands of investigators that will enable them to identify the soil fungi which they may encounter in the course of their work." This sympathetic and modest attitude of the author makes it well-nigh impossible to criticize the book which, in general, is well produced. It certainly will find its users, not only among soil mycologists, but also among others who have to identify fungi and the considerable use which its predecessor, Gilman and Abbott's Summary (1927), has found, will guarantee a wide distribution of the Manual.

Within the framework of the restrictions indicated by the author, there are a few omissions that must be mentioned. In particular the German and Russian literature has not always been considered fully and important publications like those of Duché and Heim (1931) and of Campbell on the Scottish Mucorales have been ignored. This results in the omission of a few typical soil fungi and in a certain incompleteness in the otherwise very extensive geographical records.

A much more serious criticism can be made about the illustrations. For each genus there is a small line drawing (never exceeding 2 by 2½ inch), usually redrawn from some more or less "classical" (though by no means always good!) illustration. In several cases the illustrations have suffered from redrawing. I cannot always approve of the author's choice and I certainly cannot see why, at the present stage of mycology, hundred-year-old pictures from Corda and Bonorden should be copied again and again, sometimes even in a still more mutilated form than in Lindau's works. In several cases the source is given wrongly or incorrectly. Another serious objection is that the *species* illustrated is never mentioned either in the captions or in the text. This is a dangerous principle as, strictly speaking, it is only possible to depict specimens or at most species and certainly not genera since in many cases the genera of Hyphomycetes represent very heterogeneous assemblies of species which will have to undergo considerable rearrangement in the future. It is therefore impossible to typify a genus in any other way than by a definite species. Moreover, a modern taxonomic treatise, even if it be a compilation, should not refrain from attempting to indicate generic types!

Though accepting fully the limitations of the book as expressed by the author, the question must be raised in how far systematic mycology and soil microbiology in general are served by compilations like this. For several decades systematic mycology has been in the grip of the Fries-Saccardo-Lindau tradition of shackling, artificial classification and compilation, and usually the more critical work of, for example, the French mycological schools (especially Vuillemin) has been overlooked or ignored. The same conservative attitude is adopted by Gilman who (though he mentions Mason's earlier work and Vuillemin's terminology of spore forms) states that "for the purposes of this volume the general term conidium covering all these types seems adequate". I must admit that a consistent application of Mason's newer morphological results throughout the Deuteromycetes would at present be impossible, but much more use should be made of the principles already established. This would, of course, give ample opportunity for wrong interpretations (did not Mason himself frankly admit this?) but these would surely be a challenge to critical investigations. And this is what is still badly needed in systematic mycology! I am afraid that compilations like Gilman's Manual leave mycology more or less where it is and, besides, to tyros they offer no more advantage than the popular German publications of twenty or more years ago, though most of the descriptions are more elaborate and certainly better.

W. J. LÜTJEHARMS.

CLAUDE E. ZOBELL: *Marine Microbiology*. Waltham, Mass., Chronica Botanica Co. Price \$5.00. Johannesburg, Central News Agency.

By marine microbiology, Dr. ZoBell means the study of marine bacteria, yeasts and moulds. Other small marine creatures (such as plankton) are dealt with only in relation to these. The author has made a number of important contributions to this field of work. The book is chiefly concerned with marine bacteria: their characteristics; rôle in the transformation of organic matter and sulphur compounds and in the nitrogen and phosphorus cycles of the sea; also as food for various animals. Consideration is given to marine microbiology in relation to the technology of sea foods and to such economic problems as deterioration of nets and cork. The last chapter (Chap. XVIII) is entirely devoted to the microbiology of fresh water and waters of greater and lesser salinity than oceanic water, which subjects receive some attention throughout the book.

The bibliography is extensive and consideration of published work is one of the main features of the book which "provides a key to the relevant literature". As this is scattered and frequently inaccessible, Dr. ZoBell has rendered a considerable service. In such a general review gaps in our knowledge, controversial issues and instances of lack of quantitative data inevitably emerge, and this makes the book useful to workers and prospective workers in this field.

The book is well produced and in addition to 12 diagrams contains a sketch of the Scripps Institution and a number of pleasing vignettes (by A. B. Carlin). Reference to previous and subsequent pages where related subjects are considered, makes the book easy to use.

WM. EDWYN ISAAC.